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Ionospheric Data Report — September 1963

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P/L

IONOSPHERIC DATA: BANGKOK, THAILAND

Compiled by: VICHAI T. NIMIT

Prepared for:

U.S. ARMY ELECTRONICS LABORATORIES  
FORT MONMOUTH, NEW JERSEY

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FOR THE  
THAI-U.S. MILITARY RESEARCH AND DEVELOPMENT CENTER  
SUPREME COMMAND HEADQUARTERS  
BANGKOK, THAILAND



STANFORD RESEARCH INSTITUTE  
MENLO PARK, CALIFORNIA

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## I INTRODUCTION

Ionospheric observations are being carried out at the Laboratory of the Military Research and Development Center at Bangkok, Thailand, a joint United States-Thailand organization. A Model C-2 vertical-incidence sounder supplied and operated by the United States Army Radio Propagation Agency has been installed there. Table I gives pertinent information about the site.

Table I

### VERTICAL-INCIDENCE SOUNDER SITE AT BANGKOK, THAILAND

Geographic		Geomagnetic	
Latitude	Longitude	Latitude	Longitude
13.73°N	100.57°E	2.5°N	169.83°E

Dip angle: 10°N

Distance from dip equator: 450 km

Equipment:

Instrument: Type C2 (automatic)

PRF: 60 pps

Frequency sweep time: 30 sec

Frequency sweep range: 1 to 25 Mc

Pulse duration: 50  $\mu$ sec

Peak pulse power: approximately 10 kw.

The cooperation and participation of staff members of the Thailand Ministry of Defense and the support of the United States Advanced Research

Projects Agency, the United States Army Electronics Laboratories, and the United States Army Radio Propagation Agency made it possible for the data presented in this report to be accumulated.

## II TERMINOLOGY AND SYMBOLS

The terminology and symbols used in this data report are in accordance with the conventions established by the World Wide Soundings Committee.<sup>1</sup>

### A. TERMINOLOGY

$f_oF_2$ $f_oF_1$ $f_oE$	The ordinary wave critical frequency for the $F_2$ and $F_1$ layers and the E region, respectively.
$f_oE_s$	The ordinary wave top frequency corresponding to the highest frequency at which a mainly continuous $E_s$ trace is observed.
$f_bE_s$	The blanketing frequency of an $E_s$ layer, i.e., the lowest ordinary wave frequency at which the $E_s$ layer begins to become transparent. (This is usually determined from the minimum frequency at which reflections from layers at greater heights are observed.)
$f_{min}$	The frequency below which no echoes are observed.
$M(3000)F_2$	The maximum usable frequency factor for a path of 3000 km for transmission by the $F_2$ layer.
$h'F_2$	The minimum virtual height of the ordinary wave trace for the highest stable stratification in the F region.
$h'F$	The most significant F-region virtual height parameter, that for the lowest F-region stratification. (Thus $h'F$ is identical with the current $h'F_2$ when F-region stratification is absent, i.e., at night, and with current $h'F_1$ when $F_1$ stratification is present.)

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<sup>1</sup>W. R. Piggott and K. Rawer, URSI Handbook of Ionogram Interpretation and Reduction of the World Wide Sounding Committee (Elsevier Publishing Company, Amsterdam, London, New York, 1961).



## B. DESCRIPTIVE LETTERS

Certain effects observed on ionograms may make it difficult or impossible to obtain accurate numerical values. The descriptive letters listed below, when used alone indicate, in general, the presence of a phenomenon that may have influenced the measurement. Qualifying letters (Sec. C) indicate the nature of the uncertainty.

- A A lower thin layer present, e.g., E<sub>s</sub>
- B Absorption in the vicinity of  $f_{min}$
- C Any non-ionospheric reason
- D The upper limit of the normal frequency range
- E The lower limit of the normal frequency range
- F Spread echoes present
- G Ionization density of the layer too small for measurement
- H Stratification present
- L No sufficiently definite cusp between layers of the trace
- M Ordinary and extraordinary components indistinguishable
- N Conditions such that the measurement cannot be interpreted
- O Measurement referring to the ordinary component
- R Attenuation in the vicinity of a critical frequency
- S Interference or atmospherics
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful
- V Forked trace
- W Echo lying outside the height range recorded
- X Measurement referring to the extraordinary component
- Y Intermittent trace
- Z Third magneto-ionic component present.

## C. QUALIFYING LETTERS

- D Greater than. . .
- E Less than. . .

- I An interpolated value
- J Ordinary component characteristic deduced from the extraordinary component
- O Extraordinary component characteristic deduced from the ordinary component
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful
- U Uncertain numerical value
- Z Measurement deduced from the third magneto-ionic component.

#### D. DESCRIPTION OF STANDARD TYPES OF E<sub>s</sub>

The eight standard types of E<sub>s</sub> are identified by lower-case letters: f, l, c, h, q, r, a, and s. These letters suggest the corresponding names, flat, low, cusp, high, equatorial, retardation, auroral, and slant, respectively, but are not restrictive. The letter n is used to designate an E<sub>s</sub> trace that does not correspond to one of the eight types. The classifications are:

- f An E<sub>s</sub> trace showing no appreciable increase of height with frequency, usually relatively solid at most latitudes. (This classification may be used only at night; it appears that flat E<sub>s</sub> traces observed in the daytime are classified according to their virtual height: h or l.)
- l A flat E<sub>s</sub> trace at or below the normal E-region minimum virtual height in the day or below the E-region minimum virtual height at night.
- c An E<sub>s</sub> trace showing a relatively symmetrical cusp at or below f<sub>o</sub>E. (This is usually continuous with the normal E trace, although when the deviative absorption is large, part or all of the cusp may be missing—usually a daytime type.)
- h An E<sub>s</sub> trace showing a discontinuity in height with the normal E-region trace at or above f<sub>o</sub>E and an asymmetrical cusp. (The low-frequency end of the E<sub>s</sub> trace lies clearly above the high-frequency end of the normal E trace—usually a daytime type.)
- q An E<sub>s</sub> trace that is diffuse and nonblanketing over a wide frequency range, the spread being most pronounced at the upper edge of the trace. (This type is common in daytime in the vicinity of the magnetic equator.)
- r An E<sub>s</sub> trace that is nonblanketing over part or all of its frequency range, showing an increase in virtual height at the high-frequency

end similar to group retardation. (This is distinguished from the usual group retardation—as in the case of an occulting thick E region—by the lack of group retardation in the F traces at corresponding frequencies and the lack of complete blanketing.)

- a An E<sub>s</sub> pattern having a well-defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. (These sometimes extend over several hundred kilometers of virtual height.)
- s A diffuse E<sub>s</sub> trace that rises steadily with frequency, usually emerging from another type of E<sub>s</sub> trace. (The rising trace alone is classified as s; the horizontal trace is classified separately. At high latitudes, the slant trace usually starts to rise from a horizontal E<sub>s</sub> trace, such as l or f, at frequencies that greatly exceed the E-region critical frequency, e.g., about 6 Mc; whereas at low latitudes it usually rises from equatorial-type E<sub>s</sub>, q, c, or h, at frequencies near the regular E critical frequency. Type s is never used to determine f<sub>o</sub>E unless echoes clearly identifiable as E<sub>s</sub> echoes are seen.)
- n An E trace that cannot be classified as one of the standard types. (This must not be used for intermediate cases between any two classes. A choice should always be made whenever possible, even if it is doubtful.)

#### E. MULTIPLE REFLECTIONS FROM E<sub>s</sub>

When the ionogram shows the presence of multiple reflections from E<sub>s</sub>, the number of traces seen will be recorded with the letter indicating the type.

Characteristic:  $f_{min}$

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.5 m  
September 1963

Observed at:  
Bangkok, Thailand  
Lat. 13.73°N, Long. 100.57°E  
105°E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	C	C	C	C	C	C	C	C	C	C	C	C	C
2	E017S	E015S	017	018	E017S	017	C	C	C	C	C	C	C
3	-	-	-	-	-	-	-	-	-	-	-	030	032
4	E017S	015	015	014	E011S	E014S	E018S	E018S	E029S	E027S	E027S	E026S	E027S
5	018	017	022	B	B	B	E018S	E018S	020	023	E013S	E024S	E025S
6	C	C	C	C	C	C	C	C	C	C	035	E029S	E029S
7	021	021	017	B	B	B	019	019	023	027	024	036	B
8	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C
10	021	019	026	B	B	B	E018S	023	E026S	030	E019S	E028S	038
11	E018S	016	012	015	017	012	E017S	E018S	S	E025S	E030S	S	S
12	E017S	014	012	011	011	012	E017S	E019S	E026S	E024S	E024S	E028S	E029S
13	020	019	013	012	011	012	E019S	E018S	E021S	028	035	E028S	E063S
14	E017S	018	018	013	012	B	E018S	020	028	041	045	038	E048S
15	E017S	E014S	011	011	011	E013S	E017S	022	E050S	041	041	035	040
16	E017S	014	015	017	E017S	E016S	020	E020S	035	036	035	E032S	035
17	022	019	013	014	012	020	E017S	020	027	035	036	036	033
18	E017S	E015S	022	E012S	011	016	E018S	021	031	040	050	E045S	E046S
19	E016S	012	012	013	015	016	E020S	E028S	E036S	044	E039S	E040S	E045S
20	023	018	023	024	017	B	033	032	035	043	E041S	E042S	058
21	E017S	020	012	014	012	011	E017S	065	062	063	062	052	060
22	E018S	014	018	017	014	018	019	020	028	036	036	E026S	E029S
23	E017S	015	018	012	B	016	E018S	E020S	032	039	035	037	038
24	E018S	E015S	E010E	016	013	B	E023C	E023C	C	032	031	033	E031S
25	E018S	014	012	E010E	E010E	013	E018S	E018S	027	028	043	E027S	E030S
26	E017S	015	015	014	E013S	015	E017S	E025S	027	026	E025S	E028S	E029S
27	E017S	E013S	012	013	012	017	E018S	E017S	E022S	E025S	032	035	033
28	C	C	C	C	C	C	C	C	C	C	C	C	C
29	E017S	E016S	012	017	012	011	E017S	E018S	020	E029S	E029S	E029S	033
30	E017S	E014S	016	014	B	019	E017S	E017S	E021S	E027S	041	E027S	E029S
31													
Median	017	015	015	014	012	016	018	020	027	030	035	030	033
Count	24	24	24	21	19	18	23	23	21	24	25	25	24
UQ	018	018	018	016	015	017	019	023	033	040	041	036	042
LQ	017	014	012	012	011	012	017	018	022	027	028	028	029
QR	1	4	6	4	4	5	2	5	10	13	13	8	13

\* Tabulation of 030 = 3.0 Mc.

# IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute  
September 1963

	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	C	C	C	C	C	C	C	030*	026	E017S	E017S	E017S	E017S	E017S	E018S
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	-	-	030	032	E025S	025	029	020	E018S	E024S	E017S	021	E018S	E018S	E017S
9S	E027S	E027S	E026S	E027S	E025S	E024S	E018S	E018S	024	E018S	027	035	030	024	024
0	023	E013S	E024S	E025S	E026S	041	028	026	C	C	C	C	C	C	C
	C	035	E029S	E029S	E027S	E026S	E023S	E025S	E023S	E021S	S	S	026	023	024
3	027	024	036	B	029	C	C	C	C	C	C	C	C	C	C
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	022	E019S	E029S	038	041	S	E034S	S	S	S	023	022	023	021	031
6S	030	E030S	S	S	S	S	S	S	S	S	S	E019S	E018S	E018S	E018S
	E025S	E037S	030	031	030	E027S	021	E025S	E025S	E020S	E017S	E017S	E017S	E017S	E017S
6S	E024S	E024S	E028S	E029S	E029S	E029S	E025S	E029S	E023S	E034S	E019S	E020S	E017S	E027S	E017S
LS	028	035	E028S	E063S	045	E048S	038	034	E029S	E024S	E018S	E024S	E018S	E018S	E018S
8	041	045	038	E048S	039	037	E023S	E030S	E026S	E031S	021	E018S	019	E021S	E017S
OS	041	041	035	040	041	038	033	E027S	E028S	020	019	E017S	E017S	E017S	E017S
5	036	035	E032S	035	036	030	E032S	E032S	E040S	E025S	E025S	E022S	E017S	E017S	E017S
7	035	036	036	033	E041S	E041S	E040S	E030S	E030S	E025S	E021S	E021S	E029S	E019S	E017S
L	040	050	E045S	E046S	E045S	E047S	E043S	E040S	E035S	E024S	E020S	E015S	E017S	E021S	E017S
6S	044	E039S	E040S	E045S	E049S	B	046	022	045	025	E026S	E027S	E020S	E022S	022
5	043	E041S	E042S	058	E045S	E037S	065	038	E035S	E024S	E020S	E020S	E019S	E019S	E017S
2	063	062	052	060	057	E049S	065	040	031	021	E018S	E017S	E018S	E018S	018
4	036	036	E026S	E029S	028	031	026	021	E038S	E020S	023	E018S	E020S	E020S	E018S
2	039	035	037	038	032	045	040	035	019	019	E018S	E017S	E018S	021	E017S
	032	031	033	E031S	036	037	034	035	023	E018S	E018S	E018S	E018S	E017S	E018S
7	028	043	E027S	E030S	E029S	050	038	032	E022S	E017S	E017S	E017S	E017S	E017S	E017S
7	026	E025S	E028S	E029S	040	042	070	045	035	020	E017S	E017S	E017S	E017S	E017S
2S	E025S	032	035	033	034	038	038	E022S	C	C	C	C	C	C	C
	C	C	C	C	024	037	019	020	019	020	E017S	E017S	E017S	E017S	E017S
0	E029S	E029S	E029S	033	037	035	038	023	025	E017S	E017S	E017S	E017S	018	E016S
LS	E027S	041	E027S	E029S	E029S	035	038	022	E023S	E023S	E021S	E017S	E017S	E017S	E017S
7	030	035	030	033	035	037	034	029	026	021	019	018	018	018	017
L	24	25	25	24	26	23	25	25	23	23	23	24	25	25	25
8	040	041	036	042	041	042	040	034	035	024	021	021	019	021	018
8	027	028	028	029	029	030	026	022	023	019	017	017	017	017	017
	13	13	8	13	12	12	14	12	12	5	4	4	2	4	1

B

Characteristic: foF2

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.5 m  
September 1963

Observed at:  
Bangkok, Thailand  
Lat. 13.73°N, Long. 100.57°E  
105°E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	030	U027F	027	U031F	A	A	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	A	067H
4	044	044	042	025	A	A	027	D045S	D065S	065	A	053	056
5	U043S	039	032	B	B	B	030	058	082	078	067	063H	066
6	-	-	-	-	-	-	-	-	-	-	057	058	058
7	028	029	026	B	B	B	U024S	056	063	065H	063H	A	B
8	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	075	073	067	068
10	034	043	030	B	B	B	033	067	067	076	068H	S	S
11	046	048	042	037	029	A	031	061	S	077	067	074H	070H
12	049	046	044	027H	020	020	027	060	070	065	060	068	068
13	060	074	050H	025	019	A	027	058	076	082	079H	071	070
14	053	056	057	025	018	B	029	065	071	076H	070H	071H	069
15	070	058	032	027	A	029	029	059	071H	081H	086H	087	091
16	068	052	040	031	027	018	033	075	080	085	087H	077	078H
17	063	041	025	020	A	A	032	062	075	084	078	A	074
18	056	049	023	J016A	A	A	029	060	078	081	070	070	074
19	070	064	050	045	038	028	044	066	080	093	066	061	063
20	063	060	052	033	025	B	035	069	D080R	A	077	072	071
21	064	073	063	050	031	019	034	074	077	090	097	081	082H
22	U050F	072	075	058	045	044	045	072	078	081H	081	081	065
23	046	047	038	023	B	A	041	061	052H	068	098	104	094H
24	047	D035S	037	028	A	B	031	070	C	081	075	U074A	078
25	079	065	047	026	A	A	031	056	066	083	098	104	104
26	045	050	043	038	022	021	031	069	084	077	065	068	073
27	082	077	052	032	024	019	028	061	086	089	077	076	081
28	-	-	-	-	-	-	-	-	-	-	-	-	-
29	057	059	061	031	018	017	029	067	082	087	092H	081	080
30	079	066	034	A	B	A	028	059	075	098	093	091	089
31													
Median	055	051	042	030	024	020	031	061	076	081	076	073	072
Count	24	24	24	20	12	9	23	23	21	23	24	22	24
UQ	066	065	051	035	030	028	033	069	080	086	086	081	080
LQ	046	044	032	025	019	019	028	059	069	076	067	068	068
QR	20	21	19	10	11	9	5	10	11	10	19	13	12

\* Tabulation of 083 = 8.3 Mc.

IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute  
September 1963

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	-	-	-	-	-	-	083*	096	108	095	059	050	039	033
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	A	067H	066H	069H	077	077H	086	085	077	066	055	050	050
065	A	053	056	069	063	077	098	093	080	073	061	065	057	045
078	067	063H	066	066H	075	085	101	-	-	-	-	-	-	-
-	057	058	058	056	062	074	089	D080S	D050S	S	S	053	041	035
065H	063H	A	B	064	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
075	073	067	068	072	S	U080S	S	S	S	087	081	074	056	040
076	068H	S	S	S	S	S	S	S	S	S	U100S	D085S	070	057
077	067	074H	070H	068H	068	067	A	A	A	084	071	056	057	055
065	060	068	068	072	075	080	102	101	D095S	098	075	068	070	050
082	079H	071	070	072	078	081	097	097	098	095	096	080	069	061
076H	070H	071H	069	078	081H	081	093	100	099	097	085	089	094	073
081H	086H	087	091	093	100	114	116	120	102	095	090	F	U073F	068
086	087H	077	078H	083H	084	098	098	097	089	096	100	096	092	077
084	078	A	074	081	083	089	093	U104S	106	097	099	093	081	070
081	070	070	074	071	074	084	098	104	D090S	093	074	070	068	073
093	066	061	063	062	B	078	095	102	093	083	085	090	083	075
A	077	072	071	075	080H	097	103	104	105	102	092	083	073	063
090	097	081	082H	088	093	098	110	106	110	097	081	070	063	054
081H	081	081	065	069H	087	108	093	098	102	095	102	072	049	043
068	098	104	094H	104	103	107	114	122	120	104	090	068	057	045
081	075	U074A	078	078	082	093	108	120	121	103	100	D090S	089	081
083	098	104	104	107	108	128	D130R	U140S	D130S	E100S	098	075	058	047
077	065	068	073	081	086	104	120	120	D104S	D100S	090	D091S	089	080
089	077	076	081	088	091	104	108	-	-	-	-	-	-	-
-	-	-	-	098	108	122	114	090	089	104	085	068	058	045
087	092H	081	080	085	085	091	100	108	U120S	U100S	095	090	090	088
098	093	091	089	086	092	110	126	123	103	100	091	087	074	073
081	076	073	072	076	083	091	100	102	102	097	090	075	069	057
23	24	22	24	26	23	25	24	22	22	23	24	24	25	25
086	086	081	080	086	092	105	112	120	108	100	097	089	082	073
076	067	068	068	069	075	080	094	096	090	093	078	068	059	045
10	19	13	12	17	17	25	18	24	18	7	19	21	23	28

Characteristic: M(3000)F<sub>2</sub>

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.  
September 1963

Observed at:  
Bangkok, Thailand  
Lat. 13.73°N, Long. 100.57°E  
105°E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	330	U330F	360	F	A	A	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	A	255
4	315	330	390	385	A	A	340	S	S	270	A	290	285
5	U340S	380	420	B	B	B	370	370	345	290	275	260H	275
6	-	-	-	-	-	-	-	-	-	-	26Q	265	265
7	290	310	365	B	B	B	U345S	340	285	265H	265H	A	B
8	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	285	225	260	270
10	285	360	395	B	B	B	340	375	340	280	265H	S	S
11	295	330	350	355	400	A	340	360	S	290	285	260H	250
12	340	350	350	370H	370	340	325	325	275	280	285	255	285
13	315	370	380H	360	375	A	350	350	345	305	260H	255	260
14	320	345	390	370	285	B	350	355	350	285H	285H	240H	290
15	335	370	335	350	A	340	320	315	300H	255H	265H	265	275
16	335	370	355	320	275	290	320	355	315	265	240H	255	265
17	380	375	375	375	A	A	330	365	330	275	275	A	290
18	345	370	340	A	A	A	330	330	295	250	265	270	270
19	305	350	345	335	345	360	355	360	305	270	255	270	270
20	355	350	385	345	365	B	330	345	R	A	260	260	260
21	290	315	350	355	360	360	330	365	335	305	255	245	255
22	U290F	335	340	350	340	320	295	350	305	245H	260	270	295
23	335	355	370	375	B	A	315	380	325H	285	295	335	255
24	290	S	350	350	A	B	335	360	C	260	265	U270A	270
25	320	360	380	375	A	A	345	375	370	320	285	295	265
26	310	340	360	330	370	350	330	340	295	260	270	250	285
27	335	370	380	360	370	340	340	350	335	280	260	290	280
28	-	-	-	-	-	-	-	-	-	-	-	-	-
29	330	330	300	350	280	360	330	355	340	295	235H	265	275
30	365	385	395	A	B	A	335	355	335	290	280	270	265
31													
Median	335	350	362	355	362	340	335	355	330	280	265	265	270
Count	24	23	24	18	12	9	3	22	19	23	24	22	24
UQ	368	370	382	370	370	360	345	365	340	290	277	270	283
LQ	313	330	350	350	312	330	330	345	300	265	260	255	263
QR	55	40	32	20	58	30	15	20	40	25	17	15	20

\* Tabulation of 325 = factor of 3.25.



# IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute  
September 1963

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	-	-	-	-	-	-	325*	350	390	365	375	370	330	335
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	A	255H	290H	285H	290	285H	305	320	355	345	340	330	325
270	A	290	285	285	280	310	345	370	365	365	360	370	355	345
290	275	260H	275	265H	280	310	315	-	-	-	-	-	-	-
-	260	265	265	265	270	275	310	S	S	S	S	320	295	285
265H	265H	A	B	255	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
285	225	260	270H	275	S	U285S	S	S	S	330	330	345	320	285
280	265H	S	S	S	S	S	S	S	S	S	U320S	S	340	305
290	285	260H	250H	240H	240	260	A	A	A	350	345	330	315	325
280	285	255	285	260	260	260	310	325	S	325	340	300	300	305
305	260H	255	260	275	270	270	295	305	315	335	335	345	335	320
285H	285H	240H	290	270	260H	270	295	315	310	310	290	330	315	310
255H	265H	265	275	280	285	305	345	320	320	310	305	F	U305F	305
265	240H	255	265H	255H	260	285	315	300	310	315	315	335	335	355
275	275	A	290	270	260	270	300	U315S	315	310	335	330	330	340
250	265	270	270	255	265	270	310	340	S	315	325	310	305	340
270	255	270	270	275	B	240	315	335	320	300	300	320	315	340
A	260	260	260	255	270H	290	315	325	320	325	325	315	290	280
305	255	245	255H	255	275	310	320	335	330	330	315	310	290	280
245H	260	270	295	250H	300	310	320	305	325	330	355	350	330	330
285	295	335	255H	275	270	280	300	320	320	320	350	340	340	310
260	265	U270A	270	270	260	280	310	325	330	320	310	S	330	300
320	285	295	265	275	285	290	R	S	S	S	320	335	340	310
260	270	250	285	265	285	310	330	320	S	S	300	S	315	315
280	260	290	280	255	280	310	325	-	-	-	-	-	-	-
-	-	-	-	305	330	350	355	335	315	325	345	320	280	S
295	235H	265	275	270	255	275	300	320	U330S	U320S	300	320	320	355
290	280	270	265	270	275	300	340	365	340	325	325	345	340	350
280	265	265	270	270	270	285	315	322	320	325	325	330	320	318
23	24	22	24	26	23	25	23	20	17	21	24	21	25	24
290	277	270	283	275	285	310	330	335	330	332	345	345	335	340
265	260	255	263	255	260	270	310	315	315	315	313	320	305	305
25	17	15	20	20	25	40	20	20	15	17	32	25	30	35

Characteristic: h'F<sub>2</sub>

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.5  
September 1963

Observed at:  
Bangkok, Thailand  
Lat. 13.73°N, Long. 100.57°E  
105°E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	A	375
4	-	-	-	-	-	-	-	-	-	-	-	350	335
5	-	-	-	-	-	-	-	-	L	L	340	350	355
6	-	-	-	-	-	-	-	-	-	-	430	410	428
7	-	-	-	-	-	-	-	-	L	L	380	A	B
8	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	L	350	385	360
10	-	-	-	-	-	-	-	235	300	L	355	S	S
11	-	-	-	-	-	-	-	-	S	320	E360A	350	372
12	-	-	-	-	-	-	-	-	L	L	E390A	385	343
13	-	-	-	-	-	-	-	-	265	295	340	E360A	E400B
14	-	-	-	-	-	-	-	-	L	305	315	390	335
15	-	-	-	-	-	-	-	-	E300B	E335A	310	E310A	340
16	-	-	-	-	-	-	-	-	L	L	L	L	330
17	-	-	-	-	-	-	-	-	L	L	L	A	E340A
18	-	-	-	-	-	-	-	L	L	L	L	330	325
19	-	-	-	-	-	-	-	L	L	L	350	330	E375S
20	-	-	-	-	-	-	-	-	-	A	330	335	350
21	-	-	-	-	-	-	-	E260B	270	L	L	E350A	E375B
22	-	-	-	-	-	-	-	-	L	315	300	318	320
23	-	-	-	-	-	-	-	218	L	L	L	265	320
24	-	-	-	-	-	-	-	L	-	L	L	E400A	320
25	-	-	-	-	-	-	-	-	L	L	310	275	300
26	-	-	-	-	-	-	-	-	L	L	E350A	370	320
27	-	-	-	-	-	-	-	-	L	L	320	325	295
28	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	L	L	310	E350A	310
30	-	-	-	-	-	-	-	-	L	L	265	300	300
31	-	-	-	-	-	-	-	L	L	-	-	-	-
Median Count	-	-	-	-	-	-	-	-	285 4	310 6	340 18	350 21	338 24
UQ	-	-	-	-	-	-	-	-	300	320	355	378	365
LQ	-	-	-	-	-	-	-	-	268	295	310	322	320
QR	-	-	-	-	-	-	-	-	32	25	45	56	45

\* Tabulation of 280 = 280 km .

IONOSPHERIC DATA

: 1 Mc to 25 Mc in 0.5 minute

September 1963

	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	-	-	-	-	-	-	280*	230	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	A	375	322	307	295	265	L	-	-	-	-	-	-
	-	350	335	317	300	300	250	220	-	-	-	-	-	-
340	350	355	E335A	330	288	270	-	-	-	-	-	-	-	-
430	410	428	E438A	375	335	300	-	-	-	-	-	-	-	-
380	A	B	410	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
350	385	360	350	S	340	S	S	S	S	-	-	-	-	-
355	S	S	S	S	S	S	S	S	S	-	-	-	-	-
E360A	350	372	E420A	E460A	352	A	A	A	A	-	-	-	-	-
E390A	385	343	338	L	E335A	280	260	245	-	-	-	-	-	-
340	E360A	E400B	345	325	328	280	L	-	-	-	-	-	-	-
315	390	335	332	330	310	280	L	-	-	-	-	-	-	-
310	E310A	340	320	322	290	260	L	-	-	-	-	-	-	-
L	L	330	325	335	300	E265A	E280A	-	-	-	-	-	-	-
L	A	E340A	E325A	E315S	310	280	275	-	-	-	-	-	-	-
L	330	325	365	330	315	265	L	-	-	-	-	-	-	-
350	330	E375S	E380S	B	330	280	E265S	L	-	-	-	-	-	-
330	335	350	365	335	300	275	L	-	-	-	-	-	-	-
L	E350A	E375B	368	335	E300B	260	L	-	-	-	-	-	-	-
300	318	320	L	298	297	L	L	-	-	-	-	-	-	-
L	265	320	288	280	275	L	L	-	-	-	-	-	-	-
L	E400A	320	282	330	310	L	L	-	-	-	-	-	-	-
310	275	300	L	300	280	260	L	-	-	-	-	-	-	-
E350A	370	320	265	310	E285B	L	L	-	-	-	-	-	-	-
320	325	295	290	305	275	L	-	-	-	-	-	-	-	-
-	-	-	283	275	260	240	L	-	-	-	-	-	-	-
310	E350A	310	300	300	L	L	L	-	-	-	-	-	-	-
300	300	300	300	305	288	255	230	-	-	-	-	-	-	-
0	340	350	338	328	318	300	268	260	-	-	-	-	-	-
	18	21	24	24	22	24	18	7	1	-	-	-	-	-
0	355	378	365	358	330	321	280	275	-	-	-	-	-	-
6	310	322	320	300	300	288	260	230	-	-	-	-	-	-
6	45	56	45	58	30	33	20	45	-	-	-	-	-	-

Characteristic: h'F

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.  
September 1963

Observed at:  
Bangkok, Thailand  
Lat. 13.73°N, Long. 100.57°E  
105°E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	E280A	278	240	190	A	A	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	A
4	265	223	175	200	A	A	E200S	200	E280A	295	A	E150A	E160A
5	E248S	E215A	E170B	B	B	B	E218S	E190A	E175A	E185A	E200A	E180A	A
6	-	-	-	-	-	-	-	-	-	-	E210A	E245A	E400A
7	E315S	260	230	B	B	B	E253S	E245A	E225A	E315A	E210A	A	B
8	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	E190A	215	E190A	E200A
10	E325A	E243B	E190B	B	B	B	E240S	E218A	E205A	E285A	E200A	S	S
11	E300S	E255S	E233S	230	185	A	E250S	E225A	S	E120A	A	E200A	185
12	E230B	230	200	218	E230A	E330A	E260A	E230A	E245A	E190A	A	E190A	E190A
13	255	218	175	202	E270A	A	E250A	E220A	E208A	E200A	E195A	A	B
14	E250S	240	200	202	E270A	B	242	E230A	E200A	E250B	E180B	E180B	B
15	230	202	200	E220A	A	E250A	E300A	E235A	B	A	E250B	A	E200A
16	230	205	215	E240B	E280S	E380S	E275B	230	E245A	E250A	E200A	E190A	E180A
17	200	E190B	E235A	E260A	A	A	E255A	E250A	E215A	E230A	E220A	A	A
18	220	205	E215B	E310A	A	A	E270A	230	E240A	E230B	210	E320S	E320A
19	220	210	E225A	E220A	E225A	E240A	E230A	E228A	E270A	E250S	E200A	E200S	S
20	E220S	215	200	E215B	E235A	B	245	232	E270A	A	E200A	A	E280A
21	290	258	212	203	E215A	E250A	E250A	B	B	E325B	E355B	A	B
22	304	238	230	206	225	230	260	230	E205A	E200A	E195A	180	178
23	E245A	E240A	E230A	E232A	B	A	E225S	A	E210B	E230B	E200B	E210B	E200A
24	E300S	E255A	E210A	220	A	B	E270C	215	C	E230A	E245A	A	E200A
25	225	200	190	205	A	A	E225S	212	E240A	E230A	210	E230A	E210A
26	E275S	E240B	220	210	200	E240B	E240S	220	200	E210A	A	210	200A
27	240	198	180	E200B	E240A	E310A	E240S	210	202	E180A	E235A	170	165
28	-	-	-	-	-	-	-	-	-	-	-	-	-
29	E250A	E230A	E205A	E210B	E375A	E260A	E250S	E215S	E225A	200	180	A	E200A
30	E220A	E210A	E210A	A	B	A	E245S	E216A	E206A	190	195	E170A	E200A
31													
Median	250	227	210	213	233	250	250	225	215	230	200	190	200
Count	24	24	24	20	12	9	23	21	19	22	21	16	17
UQ	285	241	227	225	270	320	260	230	245	250	217	210	205
LQ	228	208	195	202	220	250	240	215	205	190	198	180	188
QR	57	33	32	23	50	70	20	15	40	60	19	30	17

\* Tabulation of 200 = 200 km.

A

IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute

September 1963

	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	-	-	-	-	-	-	-	E250A	E190A	200*	175	170	210	E260A	E275A
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	A	A	A	A	E200A	E200A	E200A	185	195	215	222	265
A	295	A	E150A	E165A	E135A	E165A	E190A	E180A	175	188	E200B	E218A	E200S	E210S	E240B
A	E185A	E200A	E180A	A	A	E180B	170	228	-	-	-	-	-	-	-
	-	E210A	E245A	E400A	A	E200A	E188A	E210A	-	230	S	S	E235S	E280S	E318B
A	E315A	E210A	A	B	A	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E190A	215	E190A	E200A	E200B	S	E200S	S	S	S	220	220	238	E345S	E345B
A	E285A	E200A	S	S	S	S	S	S	S	S	S	E220S	210	E200S	E265S
	E120A	A	E200A	185	A	A	E210A	A	A	A	210	200	E225S	E260S	E250S
A	E190A	A	E190A	E190A	185	E195A	A	E258A	E230A	S	245	238	245	E280S	E275A
A	E200A	E195A	A	B	B	B	E200B	E200B	E215S	230	218	220	210	210	E240S
A	E250B	E180B	E180B	B	E185B	E185B	E190A	210	E220A	235	150	285	245	210	252
	A	E250B	A	E200B	E210B	E210A	E270A	220	215	235	E250A	E260A	E265A	E280A	285
A	E250A	E200A	E190A	E180A	E200A	E275A	E295A	A	A	E240S	E245A	E220A	E240A	E235A	215
A	E230A	E220A	A	A	A	S	E200S	E265A	A	248	255	240	230	230	E235A
A	E230B	210	E320S	E320S	E360S	E328S	E300S	E220S	E235S	230	220	210	250	E260S	230
A	E250S	E200A	E200S	S	S	B	B	B	S	225	E270S	E285S	225	E240S	E240S
A	A	E200A	A	E280S	E330S	E210S	E230S	E200B	E240S	E230S	230	215	220	E265S	E300B
	E325B	E355B	A	B	B	B	B	E210B	E218B	228	215	225	250	E280A	E340A
A	E200A	E195A	180	178	180	E218A	E260A	E230A	E240S	E230A	220	190	200	E230A	E270A
B	E230B	E200B	E210B	E200B	E190A	210	218	212	E218A	220	215	218	218	220	E275S
	E230A	E245A	A	E200A	180	E200B	200	200	215	230	240	260	220	220	E250S
A	E230A	210	E230A	E210A	E200A	E210B	E200B	E210B	E220A	E225A	E210A	215	220	E225A	E255S
	E210A	A	210	200	E200B	E250B	B	E260B	E250B	240	220	225	240	238	250
	E180A	E235A	170	165	180	E200B	200	210	-	-	-	-	-	-	-
	-	-	-	-	190	190	E220A	E230A	E220A	240	225	215	E250A	310	E320A
A	200	180	A	E200A	E180B	175	E200A	E205A	E260A	E230A	E235S	235	220	240	230
A	190	195	E170A	E200A	185	E195A	180	210	E220A	225	235	E230A	218	217	E240A
	230	200	190	200	190	200	200	210	220	230	220	220	225	238	255
	22	21	16	17	17	18	20	22	18	21	23	24	25	25	25
	250	217	210	205	200	210	225	230	235	235	240	236	242	272	280
	190	198	180	188	180	190	195	205	215	225	210	215	217	220	240
	60	19	30	17	20	20	30	25	20	10	30	21	25	52	40

B

Characteristic: f<sub>o</sub>F<sub>1</sub>

IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.  
September 1963

Observed at:

Bangkok, Thailand

Lat. 13.73°N, Long. 100.57°E

105°E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	A	A
4	-	-	-	-	-	-	-	-	-	A	A	042	04
5	-	-	-	-	-	-	-	-	L	L	045	043	A
6	-	-	-	-	-	-	-	-	-	-	044	044	U04
7	-	-	-	-	-	-	-	-	L	U042L	046H	A	B
8	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	042H	044	045	04
10	-	-	-	-	-	-	-	L	L	L	048	S	S
11	-	-	-	-	-	-	-	-	S	U045L	A	045	04
12	-	-	-	-	-	-	-	-	L	L	A	045	04
13	-	-	-	-	-	-	-	-	L	043	045	A	B
14	-	-	-	-	-	-	-	-	L	044	045	047	B
15	-	-	-	-	-	-	-	-	B	A	047	A	U04
16	-	-	-	-	-	-	-	-	L	L	U046L	U045L	04
17	-	-	-	-	-	-	-	-	L	L	L	A	A
18	-	-	-	-	-	-	-	L	L	L	U045L	U046S	S
19	-	-	-	-	-	-	-	L	L	L	043	043	S
20	-	-	-	-	-	-	-	-	-	A	046	A	04
21	-	-	-	-	-	-	-	B	B	L	L	A	B
22	-	-	-	-	-	-	-	-	L	U046L	047	047	04
23	-	-	-	-	-	-	-	A	L	L	L	046	04
24	-	-	-	-	-	-	-	L	C	L	L	A	04
25	-	-	-	-	-	-	-	-	L	L	045	047	04
26	-	-	-	-	-	-	-	L	L	L	A	046	04
27	-	-	-	-	-	-	-	-	L	L	045	046	04
28	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	L	L	045	A	04
30	-	-	-	-	-	-	-	L	L	042	045	046	04
31	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	-	-	-	-	-	-	-	-	-	043	045	046	04
Count	-	-	-	-	-	-	-	-	-	7	17	16	1
UQ	-	-	-	-	-	-	-	-	-	045	046	046	04
LQ	-	-	-	-	-	-	-	-	-	042	045	045	04
QR	-	-	-	-	-	-	-	-	-	3	1	1	1

\* Tabulation of 044 = 4.4 Mc.

# IONOSPHERIC DATA

weep: 1 Mc to 25 Mc in 0.5 minute  
September 1963

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	-	-	-	-	-	-	044*	037	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	A	A	A	A	A	U042L	L	-	-	-	-	-	-
A	A	042	042	045	040	044	043	L	-	-	-	-	-	-
L	045	043	A	A	045	044	U042L	-	-	-	-	-	-	-
-	044	044	U044A	A	042	043	042	L	-	-	-	-	-	-
U042L	046H	A	B	A	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
042H	044	045	045	045	S	045	S	S	S	-	-	-	-	-
L	048	S	S	S	S	S	S	S	S	-	-	-	-	-
U045L	A	045	045	A	A	043	A	A	A	-	-	-	-	-
L	A	045	045	046	U045L	A	U042L	L	S	-	-	-	-	-
043	045	A	B	B	B	045	042	L	-	-	-	-	-	-
044	045	047	B	046	045	044	043	L	-	-	-	-	-	-
A	047	A	U047S	048	047	047	042	L	-	-	-	-	-	-
L	U046L	U045L	047	047	047	A	A	A	-	-	-	-	-	-
L	L	A	A	A	S	046	U045A	A	-	-	-	-	-	-
L	U045L	U046S	S	S	S	044	045	L	-	-	-	-	-	-
L	043	043	S	S	B	B	B	L	L	-	-	-	-	-
A	046	A	048	U048S	046	045	U044L	L	-	-	-	-	-	-
L	L	A	B	B	B	B	L	L	-	-	-	-	-	-
U046L	047	047	046	045	046	044	L	L	-	-	-	-	-	-
L	L	046	047	046	U045L	045	L	L	-	-	-	-	-	-
L	L	A	047	045	046	045	L	L	-	-	-	-	-	-
L	045	047	046	L	045	045	U014L	L	-	-	-	-	-	-
L	A	046	046	044	045	B	L	L	-	-	-	-	-	-
L	045	046	047	045	046	043	L	-	-	-	-	-	-	-
-	-	-	-	046	045	045	L	L	-	-	-	-	-	-
L	045	A	045	045	045	U042L	L	L	-	-	-	-	-	-
042	045	046	047	046	045	046	U040L	L	-	-	-	-	-	-
043	045	046	046	046	045	045	043	-	-	-	-	-	-	-
7	17	16	16	15	17	19	14	1	-	-	-	-	-	-
045	046	046	047	046	046	045	044	-	-	-	-	-	-	-
042	045	045	045	045	045	044	042	-	-	-	-	-	-	-
3	1	1	2	1	1	1	2	-	-	-	-	-	-	-

Characteristic: M(3000)F1

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.  
September 1963

Observed at:  
Bangkok, Thailand  
Lat. 13.73°N, Long. 100.57°E  
105°E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	A	A
4	-	-	-	-	-	-	-	-	-	A	A	440	440
5	-	-	-	-	-	-	-	-	L	L	385	415	A
6	-	-	-	-	-	-	-	-	-	-	395	415	A
7	-	-	-	-	-	-	-	-	L	U380L	380H	A	B
8	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	410H	410	425	410
10	-	-	-	-	-	-	-	L	L	L	390	S	S
11	-	-	-	-	-	-	-	-	S	U380L	A	430	425
12	-	-	-	-	-	-	-	-	L	L	A	405	430
13	-	-	-	-	-	-	-	-	L	400	410	A	B
14	-	-	-	-	-	-	-	-	L	395	400	400	B
15	-	-	-	-	-	-	-	-	B	A	380	A	U400S
16	-	-	-	-	-	-	-	-	L	L	U400L	U400L	400
17	-	-	-	-	-	-	-	-	L	L	L	A	A
18	-	-	-	-	-	-	-	L	L	L	U390L	U380S	S
19	-	-	-	-	-	-	-	L	L	L	370	410	S
20	-	-	-	-	-	-	-	-	-	A	415	A	365
21	-	-	-	-	-	-	-	B	B	L	L	A	B
22	-	-	-	-	-	-	-	-	L	U380L	390	410	420
23	-	-	-	-	-	-	-	A	L	L	I	370	370
24	-	-	-	-	-	-	-	L	C	L	L	A	400
25	-	-	-	-	-	-	-	-	L	L	380	390	400
26	-	-	-	-	-	-	-	L	L	L	A	395	415
27	-	-	-	-	-	-	-	-	L	L	400	400	405
28	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	L	L	395	A	405
30	-	-	-	-	-	-	-	-	L	L	400	390	400
31	-	-	-	-	-	-	-	L	L	400	395	390	400
Median	-	-	-	-	-	-	-	-	-	395	395	402	405
Count	-	-	-	-	-	-	-	-	-	7	17	16	15
UQ	-	-	-	-	-	-	-	-	-	400	400	415	420
LQ	-	-	-	-	-	-	-	-	-	380	383	393	400
QR	-	-	-	-	-	-	-	-	-	20	17	22	20

\* Tabulation of 380 = factor of 3.8.

A



IONOSPHERIC DATA  
 eep: 1 Mc to 25 Mc in 0.5 minute  
 September 1963

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	-	-	-	-	-	-	380*	420	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	A	A	A	A	A	U400L	L	-	-	-	-	-	-
A	A	440	440	450	445	410	400	L	-	-	-	-	-	-
L	385	415	A	A	400	410	U380L	-	-	-	-	-	-	-
-	395	415	A	A	420	395	370	L	-	-	-	-	-	-
U380L	380H	A	B	A	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
410H	410	425	410	420	S	395	S	S	S	-	-	-	-	-
L	390	S	S	S	S	S	S	S	S	-	-	-	-	-
U380L	A	430	425	A	A	415	A	A	A	-	-	-	-	-
L	A	405	430	410	U400L	A	L	L	S	-	-	-	-	-
400	410	A	B	B	B	390	380	L	-	-	-	-	-	-
395	400	400	B	405	420	390	380	L	-	-	-	-	-	-
A	380	A	U400S	380	390	375	395	L	-	-	-	-	-	-
L	U400L	U400L	400	400	360	A	A	A	-	-	-	-	-	-
L	L	A	A	A	S	410	U405A	A	-	-	-	-	-	-
I.	U390L	U380S	S	S	S	360	410	L	-	-	-	-	-	-
I.	370	410	S	S	B	B	B	L	L	-	-	-	-	-
A	415	A	365	U360S	370	375	U370L	L	-	-	-	-	-	-
L	L	A	B	B	B	B	L	L	-	-	-	-	-	-
U380L	390	410	420	425	395	390	L	L	-	-	-	-	-	-
L	L	370	370	370	U390L	375	L	L	-	-	-	-	-	-
L	L	A	400	420	365	375	L	L	-	-	-	-	-	-
L	380	390	400	L	380	385	U400L	L	-	-	-	-	-	-
L	A	395	415	430	410	B	L	L	-	-	-	-	-	-
L	400	400	405	425	390	400	L	-	-	-	-	-	-	-
-	-	-	-	400	390	390	L	L	-	-	-	-	-	-
L	395	A	405	420	400	U390L	L	L	-	-	-	-	-	-
400	395	390	400	410	405	300	U400L	L	-	-	-	-	-	-
395	395	402	405	410	395	390	395	-	-	-	-	-	-	-
7	17	16	15	15	17	19	13	1	-	-	-	-	-	-
400	400	415	420	425	407	400	400	-	-	-	-	-	-	-
380	383	393	400	400	385	375	380	-	-	-	-	-	-	-
20	17	22	20	25	22	25	20	-	-	-	-	-	-	-

Characteristic:  $f_oE$

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.5  
September 1963

Observed at:  
Bangkok, Thailand  
Lat.  $13.73^\circ N$ , Long.  $100.57^\circ E$   
 $105^\circ E$  Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	A	A
4	-	-	-	-	-	-	-	-	-	A	A	A	A
5	-	-	-	-	-	-	-	-	A	A	A	A	A
6	-	-	-	-	-	-	-	-	-	-	A	A	A
7	-	-	-	-	-	-	S	A	A	A	A	A	B
8	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	A	A	A	-
10	-	-	-	-	-	-	-	A	A	A	A	S	S
11	-	-	-	-	-	-	-	-	S	A	A	A	A
12	-	-	-	-	-	-	-	-	A	A	A	A	A
13	-	-	-	-	-	-	-	-	A	A	A	A	B
14	-	-	-	-	-	-	-	-	-	A	B	B	B
15	-	-	-	-	-	-	-	-	B	A	B	A	B
16	-	-	-	-	-	-	-	-	A	A	A	A	A
17	-	-	-	-	-	-	-	-	A	A	A	A	A
18	-	-	-	-	-	-	-	-	A	A	B	S	S
19	-	-	-	-	-	-	-	S	S	S	A	S	S
20	-	-	-	-	-	-	-	A	A	A	S	S	S
21	-	-	-	-	-	-	-	B	B	B	B	B	B
22	-	-	-	-	-	-	-	-	A	A	A	A	A
23	-	-	-	-	-	-	-	A	B	B	B	B	B
24	-	-	-	-	-	-	-	C	C	A	A	A	A
25	-	-	-	-	-	-	-	A	A	A	B	A	A
26	-	-	-	-	-	-	-	B	B	A	A	A	A
27	-	-	-	-	-	-	-	S	A	A	A	A	A
28	-	-	-	-	-	-	-	-	-	-	-	340*	340
29	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	A	A	A	A	A	A
31	-	-	-	-	-	-	-	A	A	A	A	A	A
Median Count	-	-	-	-	-	-	-	-	-	-	-	-	-
UQ	-	-	-	-	-	-	-	-	-	-	-	-	-
LQ	-	-	-	-	-	-	-	-	-	-	-	-	-
QR	-	-	-	-	-	-	-	-	-	-	-	-	-

\* Tabulation of 340 = 3.4 Mc.

# IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute

September 1963

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	-	-	-	-	-	-	A	A	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	A	A	A	A	A	A	A	-	-	-	-	-	-
A	A	A	A	A	A	A	A	A	S	-	-	-	-	-
A	A	A	A	A	A	B	R	U285S	-	-	-	-	-	-
-	A	A	A	A	A	A	A	A	B	-	-	-	-	-
A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A	A	A	A	B	B	S	S	S	S	S	-	-	-	-
A	A	S	S	S	S	S	S	S	S	S	-	-	-	-
A	A	A	A	A	A	A	A	A	A	A	-	-	-	-
A	A	A	A	A	A	A	A	A	A	S	-	-	-	-
A	A	A	B	B	B	B	B	B	S	-	-	-	-	-
A	B	B	B	B	B	B	A	A	A	-	-	-	-	-
A	A	A	A	A	A	A	A	A	A	-	-	-	-	-
A	A	A	A	A	A	A	A	A	S	-	-	-	-	-
B	B	S	S	S	S	S	S	S	S	-	-	-	-	-
S	A	S	S	S	S	B	B	B	S	A	-	-	-	-
A	S	S	S	S	S	S	B	B	S	-	-	-	-	-
B	B	B	B	B	B	B	B	B	B	-	-	-	-	-
A	A	A	A	A	A	A	A	A	A	A	-	-	-	-
B	B	B	B	B	A	B	B	A	A	A	-	-	-	-
A	A	A	A	A	B	B	U330R	R	A	S	-	-	-	-
A	B	A	A	A	A	B	B	B	A	A	-	-	-	-
A	A	A	A	A	B	B	B	B	B	A	-	-	-	-
-	-	340*	340	U360R	A	A	U280R	-	-	-	-	-	-	-
A	A	A	A	A	B	A	A	A	S	-	-	-	-	-
A	A	A	A	A	A	A	A	A	S	-	-	-	-	-
A	A	A	A	A	A	A	A	A	A	-	-	-	-	-
-	-	-	1	1	-	1	2	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Characteristic: h'E

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.5 mi  
September 1963

Observed at:  
Bangkok, Thailand  
Lat. 13.73°N, Long. 100.57°E  
105°E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12	
1	-	-	-	-	-	-	-	-	-	-	-	-	-	
2	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	-	-	-	-	-	-	-	-	-	-	-	A	B	
5	-	-	-	-	-	-	-	-	-	A	A	B	B	
6	-	-	-	-	-	-	-	-	A	A	A	A	A	
7	-	-	-	-	-	-	-	-	-	-	122	112	111	
8	-	-	-	-	-	-	S	A	110	110	110	A	B	
9	-	-	-	-	-	-	-	-	-	-	-	-	-	
10	-	-	-	-	-	-	-	-	-	A	E120A	100	B	
11	-	-	-	-	-	-	-	S	115	110	110	S	S	
12	-	-	-	-	-	-	-	-	S	105	S	110	115	
13	-	-	-	-	-	-	-	-	105	102	101	100	099	
14	-	-	-	-	-	-	-	-	A	110	108	A	B	
15	-	-	-	-	-	-	-	-	-	A	B	B	B	
16	-	-	-	-	-	-	-	-	B	B	B	A	B	
17	-	-	-	-	-	-	-	-	B	B	E110B	E110B	B	
18	-	-	-	-	-	-	-	-	B	B	B	B	B	
19	-	-	-	-	-	-	-	B	B	B	B	S	S	
20	-	-	-	-	-	-	-	S	S	S	S	S	S	
21	-	-	-	-	-	-	-	B	A	A	S	S	S	
22	-	-	-	-	-	-	-	B	B	B	B	B	B	
23	-	-	-	-	-	-	-	-	B	B	A	A	A	
24	-	-	-	-	-	-	-	A	B	B	B	B	B	
25	-	-	-	-	-	-	-	C	C	A	A	A	A	
26	-	-	-	-	-	-	-	112	B	A	B	A	A	
27	-	-	-	-	-	-	-	B	B	100	A	A	100	
28	-	-	-	-	-	-	-	S	100	A	A	108	E110B	
29	-	-	-	-	-	-	-	-	-	-	-	-	-	
30	-	-	-	-	-	-	-	A	A	A	110	E118S	B	
31	-	-	-	-	-	-	-	112	108	E120S	E115S	110	108	
Median	-	-	-	-	-	-	-	-	108	110	110	110	109	
Count	-	-	-	-	-	-	-	2	5	7	9	8	6	
UQ	-	-	-	-	-	-	-	-	113	110	117	111	111	
LQ	-	-	-	-	-	-	-	-	103	102	109	104	100	
QR	-	-	-	-	-	-	-	-	10	8	8	7	11	

\* Tabulation of 100 = 100 km.

IONOSPHERIC DATA

weep: 1 Mc to 25 Mc in 0.5 minute

September 1963

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	-	-	-	-	-	-	A	A	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	A	B	B	B	B	B	B	-	-	-	-	-	-
A	A	B	B	B	B	B	B	E122S	S	-	-	-	-	-
A	A	A	A	A	B	100*	E135S	-	-	-	-	-	-	-
-	122	112	111	A	A	A	A	B	-	-	-	-	-	-
110	110	A	B	A	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A	E120A	100	B	B	S	S	S	S	S	-	-	-	-	-
110	110	S	S	S	S	S	S	S	S	-	-	-	-	-
105	S	110	115	112	A	A	A	A	A	-	-	-	-	-
102	101	100	099	S	108	108	108	110	S	-	-	-	-	-
110	108	A	B	B	B	B	B	S	-	-	-	-	-	-
A	B	B	B	B	B	B	A	102	A	-	-	-	-	-
B	B	A	B	B	B	B	B	108	S	-	-	-	-	-
B	E110B	E110B	B	B	110	S	S	S	S	-	-	-	-	-
B	B	B	B	S	S	S	S	S	S	-	-	-	-	-
B	B	S	S	S	S	S	S	S	S	-	-	-	-	-
S	S	S	S	S	B	B	B	S	A	-	-	-	-	-
A	S	S	S	S	S	S	B	S	-	-	-	-	-	-
B	B	B	B	B	B	B	B	B	-	-	-	-	-	-
B	A	A	A	A	A	A	A	S	A	-	-	-	-	-
B	B	B	B	B	B	B	B	B	A	-	-	-	-	-
A	A	A	A	B	B	110	105	B	S	-	-	-	-	-
A	B	A	A	A	B	B	B	B	A	-	-	-	-	-
100	A	A	100	B	B	B	B	B	A	-	-	-	-	-
A	A	108	E110B	E110B	B	108	110	-	-	-	-	-	-	-
-	-	-	-	A	B	A	A	A	S	-	-	-	-	-
A	110	E118S	B	B	115	108	109	B	S	-	-	-	-	-
E120S	E115S	110	108	110	106	B	A	A	S	-	-	-	-	-
110	110	110	109	110	109	108	108	-	-	-	-	-	-	-
7	9	8	6	3	4	5	7	2	-	-	-	-	-	-
110	117	111	111	111	113	110	110	-	-	-	-	-	-	-
102	109	104	100	110	107	108	105	-	-	-	-	-	-	-
8	8	7	11	1	6	2	5	-	-	-	-	-	-	-

B

Characteristic: fbEs

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.5 min  
September 1963

Observed at:  
Bangkok, Thailand  
Lat. 13.73°N, Long. 100.57°E  
105°E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12	
1	-	-	-	-	-	-	-	-	-	-	-	-	-	
2	021	B	B	B	-	-	-	-	-	-	-	-	-	
3	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	S	S	B	-	-	-	S	-	050M	045M	A	095M	048M	
5	B	031M	B	B	B	B	S	025M	032M	037M	042M	032M	036	
6	-	-	-	-	-	-	-	-	-	-	-	037M	052M	
7	B	B	B	B	B	B	-	-	-	-	039	043	043	
8	-	-	-	-	-	-	-	033M	035	044M	038M	A	B	
9	-	-	-	-	-	-	-	-	-	-	-	-	-	
10	B	B	B	B	B	B	S	-	-	033M	040	041	041	
11	S	B	B	B	B	A	M	028	035	043M	041M	S	S	
12	B	B	B	013	016M	018	-	028M	S	037	042	042	039	
13	B	B	B	013	018M	A	019M	030	038M	034	050M	038	038	
14	S	B	B	B	014	B	S	026	031	034	040M	048M	B	
15	-	-	012	016M	A	A	022M	033M	032	B	B	B	B	
16	024M	021M	020M	B	S	S	B	030M	B	053M	B	045M	B	
17	B	B	022M	A	A	A	022M	026M	042M	042M	040	039	040M	
18	B	016	B	A	A	A	019M	050M	036	040M	041M	A	A	
19	016	017	020	017	021M	022	024M	025	037	B	B	S	S	
20	S	B	B	B	-	B	B	035M	043M	S	039	S	S	
21	B	B	B	B	019	A	020M	036	-	A	042M	047M	S	
22	M	017M	B	B	020	B	019	B	B	B	B	053	B	
23	025	027	030	020	B	A	-	032M	032	036M	048M	040	036	
24	M	019M	017M	B	A	B	C	026	B	B	-	B	B	
25	S	B	-	012	A	A	M	-	C	041	055M	065M	040	
26	-	B	B	B	S	B	026	038M	040M	B	B	042M	042	
27	B	B	B	-	020	A	S	B	B	037	050	040	038M	
28	-	-	-	-	-	-	-	S	029M	030	041	G	G	
29	020M	020M	022M	B	015	015	-	-	-	-	-	-	-	
30	040M	029M	025M	A	B	A	-	022	034	031	035M	062M	040	
31							-	023	030	033	036	035	039	
Median	023	020	021	014	019	022	020	028	035	037	041	042	040	
Count	6	9	8	6	8	3	7	18	16	18	18	18	14	
UQ	025	028	023	017	020	020	022	033	038	042	042	048	042	
LQ	020	017	019	013	016	017	019	026	032	034	039	039	038	
QR	5	11	4	4	4	3	3	7	6	8	3	9	4	

\* Tabulation of 034 = 3.4 Mc.

# IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute  
September 1963

	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	-	-	-	-	-	-	-	040M	034*	034M	024M	-	019	027M	023
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	095M	048M	049	046M	045	037M	032M	026	026	B	-	S	S
0M	045M	A	032M	036	037	035M	038	032	028	021	B	B	B	B	B
2M	037M	042M	037M	052M	050M	B	G	031	-	-	-	-	-	-	-
	-	039	043	043	050M	035M	035M	032	M	S	S	S	B	B	B
5	044M	038M	A	B	046M	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	033M	040	041	041	B	S	S	S	S	S	B	B	B	B	B
5	043M	041M	S	S	S	S	S	S	S	S	S	S	025M	S	S
	037	042	042	039	050M	045M	034	A	A	A	-	S	S	S	S
3M	034	050M	038	038	038M	038	058M	038M	033M	S	B	B	020	S	021M
1	034	040M	048M	B	B	B	B	B	S	021M	024M	025	020	B	-
2	B	B	B	B	B	B	034	033	034	S	B	025M	021	S	S
	053M	B	045M	B	B	040	045M	035	028	026M	023M	020M	020M	021M	020M
2M	042M	040	039	040M	036	044M	047	044	050	S	025	027	034	031M	023
5	040M	041M	A	A	045M	S	S	040M	048M	S	022M	035M	S	020	026M
7	B	B	S	S	S	S	S	S	S	023M	S	S	021M	S	018
3M	S	039	S	S	S	B	B	-	B	032M	S	S	S	S	S
	A	042M	047M	S	S	S	S	B	S	S	S	S	S	S	B
	B	B	053	B	B	B	B	B	B	B	B	B	S	025M	025
2	036M	048M	040	036	040	041	041	036M	S	038	S	B	B	024M	038M
	B	-	B	B	036	B	B	B	026	029M	M	M	M	B	-
	041	055M	065M	040	B	B	G	G	026	S	S	S	S	S	S
3M	040M	B	042M	042	040	B	B	B	029	030M	025	M	M	023	-
	037	050	040	038M	B	B	B	B	B	M	B	B	B	B	B
0M	030	041	G	G	G	B	033	G	-	-	-	-	-	-	-
	-	-	-	-	045	B	042	036	027	S	S	M	023M	020	024M
	031	035M	062M	040	B	035	033	030	052M	031M	S	-	-	022	020
	033	036	035	039	036	036	034	033	032	023	S	031M	-	019M	025M
	037	041	042	040	043	039	038	036	032	027	024	026	021	022	023
	18	18	18	14	14	10	13	14	14	12	7	6	8	10	11
	042	042	048	042	049	044	045	038	034	031	025	031	024	025	025
	034	039	039	038	037	035	034	032	028	023	023	025	020	020	020
	8	3	9	4	12	9	11	6	6	8	2	6	4	5	5

B

Characteristic:  $f_oE_s$

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.  
September 1963

Observed at:  
Bangkok, Thailand  
Lat.  $13.73^\circ\text{N}$ , Long.  $100.57^\circ\text{E}$   
 $105^\circ\text{E}$  Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	045	B	B	B	021	020	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	S	S	B	020	030	027	S	037	080M	090M	100M	095M	080
5	B	038M	B	B	B	B	S	036M	048M	047M	055M	065M	039
6	-	-	-	-	-	-	-	-	-	-	-	042	065
7	B	B	B	B	B	B	026	050M	045	083M	090M	046	044
8	-	-	-	-	-	-	-	-	-	-	-	066	B
9	-	-	-	-	-	-	-	-	-	-	-	-	-
10	B	B	B	B	B	B	S	029	038	038M	047	048	042
11	S	B	B	B	B	021	040M	040M	S	050M	050M	S	S
12	B	B	B	016	025M	029	022	040	045M	039	042	043	041
13	B	B	B	013	019M	021M	028M	035	032	036	065M	045	045
14	S	B	B	B	016	B	S	045M	032	036	060M	055M	B
15	026	022	012	050M	040	031	033M	065M	032	B	B	B	B
16	035M	035M	027M	B	S	S	B	035M	B	061M	B	075M	B
17	B	B	055M	041M	022M	031M	026M	015M	066M	057M	045	044	075
18	B	016	B	020	013	025	045M	025	046	045M	053M	140M	180
19	019	021	020	018	038M	025	044M	060M	037	B	B	S	S
20	S	B	B	B	024	B	B	037	043	S	041	S	S
21	B	B	B	B	025	034M	029M	B	043	100M	080M	058M	S
22	055M	025M	B	B	021	B	027	B	B	B	B	057	B
23	025	045	040	020	B	022M	025	075M	032	041M	055M	050	047
24	030M	030M	030M	B	027M	B	C	026	B	B	045	B	B
25	S	B	018	013	030M	026M	029	029	C	045	055M	055M	048
26	025	B	B	B	S	025M	026	026	042M	048M	B	030M	030
27	B	B	B	018	023	B	S	B	B	037	090	040	055
28	-	-	-	-	-	018	S	S	033M	045	046	G	G
29	045M	045M	046M	B	-	-	-	-	-	-	-	-	-
30	078M	058M	058M	018	023	020	021	040	045	045	090M	090M	055
31					B	020	021	023	030	033	036	035	040
Median	033	033	030	018	023	025	026	037	043	045	054	058	048
Count	10	10	9	11	16	15	14	20	17	19	20	20	15
UQ	045	045	043	020	029	029	033	048	047	057	073	090	065
LQ	025	022	022	016	021	020	025	029	032	038	045	046	042
QR	20	23	21	4	8	9	8	19	15	19	23	44	23

\* Tabulation of 034 = 3.4 Mc.



# IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute  
September 1963

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	-	-	-	-	-	-	058M	034*	044M	039M	024	026	040	031
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	095M	080M	055	070M	045	075M	070M	037	031	B	028	S	S
090M	100M	065M	039	037	050M	041	032	028	022	B	B	B	B	B
047M	055M	085M	065M	053M	B	G	031	-	-	-	-	-	-	-
-	042	046	044	085M	075M	070M	038	036M	S	S	S	B	B	B
083M	090M	066	E	055M	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
038M	047	048	042	B	S	S	S	S	S	B	B	B	B	B
050M	050M	S	S	S	S	S	S	S	S	S	S	038M	S	S
039	042	043	041	104M	090M	046	090M	070M	060M	023	S	S	S	S
036	065M	045	045	050M	040	075M	046M	043M	S	B	B	020	S	032M
036	060M	055M	B	B	B	B	B	S	035M	032M	029	B	B	032
B	B	B	B	B	B	038	033	036	S	B	040M	031	S	S
061M	B	075M	B	B	040	052M	038	030	029M	028M	038M	030M	040M	045M
057M	045	044	075M	042	065M	052	049	070	S	046	047	055	050M	026
045M	053M	140M	180M	095M	S	S	045M	068M	S	041M	052M	S	025	046M
B	B	S	S	S	S	S	S	S	031M	S	S	035M	S	019
S	041	S	S	S	B	B	028	B	039M	S	S	S	S	S
100M	080M	058M	S	S	S	S	B	S	S	S	S	S	S	B
B	B	057	B	B	B	B	B	B	E	B	B	B	045M	050
041M	055M	050	047	040	041	041	041M	S	038	S	B	B	045M	045M
B	045	B	B	036	B	B	B	029	043M	035M	030M	030M	B	030
045	055M	095M	048	B	B	G	G	026	S	S	S	S	S	S
048M	B	080M	050	045	B	B	B	029	050M	050	035M	032M	030	025
037	090	040	055M	B	B	B	B	B	043M	B	B	B	B	B
045	046	G	G	G	B	033	G	-	-	-	-	-	-	-
-	-	-	-	045	B	042	036	027	S	S	045M	035M	025	035M
045	090M	090M	055	B	035	035	031	057M	041M	S	019	020	028	030
033	036	035	040	036	036	034	039	033	025	S	067M	030	045M	057M
045	054	058	048	048	046	042	038	029	039	035	038	030	040	032
19	20	20	15	14	10	13	16	16	14	9	11	13	10	14
057	073	090	065	055	070	052	048	063	043	044	047	035	045	045
038	045	046	042	040	040	037	033	035	031	030	029	027	028	030
19	28	44	23	15	30	15	15	28	12	14	18	8	17	15

Characteristic:  $h'F_2$

IONOSPHERIC DATA  
Sweep: 1 Mc to 25 Mc in 0.5  
September 1963

Observed at:  
Bangkok, Thailand  
Lat.  $13.73^{\circ}\text{N}$ , Long.  $100.57^{\circ}\text{E}$   
 $105^{\circ}\text{E}$  Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	-	-	-	-	-	-	-	-	-	-	-	-	-
2	085	B	B	B	100	098	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	S	S	B	108	101	102	S	100	095	096	082	082	083
5	B	089	B	B	B	B	S	100	085	080	082	082	082
6	-	-	-	-	-	-	-	-	-	-	088	100	085
7	B	B	B	B	B	B	110	113	113	107	120	118	119
8	C	C	C	C	C	C	C	C	C	C	108	110	B
9	C	C	C	C	C	C	C	C	C	C	C	C	C
10	B	B	B	B	B	B	S	115	110	105	105	120	121
11	S	B	B	B	B	119	110	108	S	110	110	S	S
12	B	B	B	110	110	108	100	110	105	110	110	110	118
13	B	B	B	125	118	111	100	104	100	110	100	100	095
14	S	B	B	B	120	B	S	108	112	115	110	100	B
15	115	115	113	105	110	115	115	110	112	B	B	B	B
16	096	100	100	B	S	S	B	115	B	102	B	100	B
17	B	B	090	093	110	108	100	115	112	110	110	108	105
18	B	135	B	122	115	115	100	100	099	100	100	098	098
19	095	096	095	095	110	115	110	120	120	B	B	S	S
20	S	B	B	B	107	095	105	100	100	S	115	S	S
21	B	B	B	B	107	B	B	100	100	100	097	102	S
22	100	100	B	B	115	112	111	B	B	B	B	102	B
23	096	100	100	100	098	B	110	108	115	115	098	095	098
24	102	100	-	100	B	105	108	095	B	B	100	B	B
25	S	B	125	B	097	B	C	110	C	097	095	095	095
26	100	B	B	115	110	110	111	110	104	098	B	090	094
27	B	B	B	B	S	B	S	B	B	103	096	100	110
28	C	C	C	120	110	112	S	S	100	100	100	G	G
29	118	-	100	C	C	C	C	C	C	C	C	C	C
30	096	095	094	B	112	110	110	105	100	100	098	100	110
31				090	B	115	113	112	110	125	115	110	115
Median	098	100	100	108	110	110	110	108	104	102	100	100	098
Count	10	9	8	11	16	15	14	20	17	19	20	20	15
UQ	102	108	107	120	114	115	111	111	112	110	110	109	115
LQ	096	096	095	095	104	105	105	100	100	098	098	097	094
QR	6	12	12	25	10	10	6	11	12	12	12	12	21

\* Tabulation of 075 = 75 km.

# IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute  
September 1963

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	-	-	-	-	-	-	-	075*	080	075	088	080	120	112	085
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	082	083	075	080	080	078	077	077	075	B	085	S	S
095	096	082	082	082	080	082	080	080	125	075	B	B	B	B	B
085	080	088	100	085	079	B	G	160	-	-	-	-	-	-	-
-	-	120	118	119	095	096	098	097	-	S	S	S	B	B	B
113	107	108	110	B	095	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	090	105	120	121	B	S	S	S	S	S	B	B	B	B	B
110	105	110	S	S	S	S	S	S	S	S	S	S	110	S	S
S	110	110	110	118	107	085	090	085	086	085	180	S	S	S	S
105	110	100	100	095	098	110	100	102	102	S	B	B	115	S	096
100	115	110	100	B	B	B	B	B	S	090	085	101	B	B	112
112	B	B	B	B	B	B	085	115	105	S	B	100	100	S	S
B	102	B	100	B	B	128	116	115	115	110	110	108	100	100	098
112	110	110	108	105	112	108	103	098	104	S	098	090	086	095	088
099	098	100	098	098	099	S	S	115	110	S	110	105	S	102	100
120	B	B	S	S	S	S	S	S	S	108	S	S	095	S	095
100	S	115	S	S	S	B	B	090	B	100	S	S	S	S	S
100	100	097	102	S	S	S	S	B	S	S	S	S	S	S	B
B	B	B	102	B	B	B	B	B	B	B	B	S	S	095	100
115	115	098	095	098	097	095	092	090	S	090	S	B	B	095	096
B	B	100	B	B	118	B	B	B	110	100	100	100	100	B	100
C	097	095	090	095	B	B	G	G	155	S	S	S	S	S	S
104	098	B	090	094	095	B	B	B	105	100	100	100	102	098	100
B	103	096	100	110	B	B	B	B	B	105	B	B	B	B	B
100	100	100	G	G	G	B	135	G	C	C	C	C	C	C	C
C	C	C	C	C	085	B	085	086	085	S	S	130	105	100	100
100	100	098	100	110	B	115	110	112	110	102	S	132	128	100	096
110	125	115	110	115	122	110	112	090	093	110	S	-	160	100	100
104	102	100	100	098	096	102	098	094	105	100	100	100	100	100	099
17	19	20	20	15	14	10	13	16	15	14	9	10	13	10	14
112	110	110	109	115	107	110	111	114	110	105	110	108	112	100	100
100	098	098	097	094	085	085	085	086	086	085	087	100	098	095	096
12	12	12	12	21	22	25	26	28	24	20	23	8	14	5	4

Characteristic: Type of E<sub>s</sub>

IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in ( )  
September 1963

Observed at:

Bangkok, Thailand

Lat. 13.73°N, Long. 100.57°E

105°E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	c	c	c	c	c	c	c	c	c	c	c	c	c
2	f2	-	-	-	f	f	c	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	h4	h4
4	-	-	-	f	f2	f	-	f	h3	h3	h4	h	h
5	f	f	f	-	-	-	-	h	cl	cl2	c2h	cl	c2
6	c	c	c	c	c	c	c	c	c	c	c	c	c
7	-	-	-	-	f	f	h	h2	c	c2	c2	c2	c2
8	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	h	h	c	c
10	f	-	-	-	-	-	-	c	c	c2	c	-	-
11	-	-	-	-	-	f2	f	f	-	c	c	c	c
12	-	-	f	f	f2	f3	f	f3	c2	c	c2	h	h
13	-	-	-	f	f	f2	f	f	h	c	c	h	h
14	-	-	-	-	f	f	f	f2	c	c	-	-	-
15	f	f3	f	f3	f4	f	f	f	-	c	-	h	h
16	f3	f2	f	f	-	-	-	f	f	h	c	c	c
17	-	f	f3	f	f	f2	f2	h5	h2	h	h	h3	h
18	f	f	f	f	f	f2	f2	c	c	c	-	-	-
19	f	f	f	f	f2	f	f	h	h	-	c	-	-
20	-	-	-	-	f	-	-	c	h	h3	h2	h	h
21	-	-	-	f	f	f	f	-	-	-	-	h	h
22	f2	f	f	-	f	-	f	f2	c	c	h	h	h
23	f	f2	f3	f	-	f	f	h	h	-	h	-	-
24	f	f2	f2	f	f2	f	-	f	-	h	h2	h2	h2
25	-	-	f	f	f3	f2	f	c	c	h	c	h2	h2
26	f	-	-	-	-	-	-	c	c	c	h4	h	h
27	-	-	-	f	f3	f	-	-	c	h	h	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-
29	f3	f4	f	f	f2	f2	f	h	h2	h	h	c3	c
30	f4	f4	f2	f	f	f	f	c	c	c	c	c	c
31													
Median	-	-	-	-	-	-	-	-	-	-	-	-	-
Count	-	-	-	-	-	-	-	-	-	-	-	-	-
UQ	-	-	-	-	-	-	-	-	-	-	-	-	-
LQ	-	-	-	-	-	-	-	-	-	-	-	-	-
QR	-	-	-	-	-	-	-	-	-	-	-	-	-

A

# IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute  
September 1963

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
c	c	c	c	c	c	c	c	l2	l	l	f	f	f	f2	f
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
l3	l3	l4	l	l2	l2	l2	l	l2	l2	l2	l	-	f	-	-
cl	cl2	c2l	cl	c2l	cl	-	-	h	c	c	c	f	c	c	c
c	c	c	c	c	l	l	l2	l2	l	-	-	-	-	-	-
c	c2	c2	c2	-	l	7g	7g	7g	7g	7g	7g	7g	7g	7g	7g
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	l	lc	c	c	-	-	-	-	-	-	f	-	-	-	-
-	c2	c	-	-	-	-	-	-	-	-	-	-	f3	-	-
c2	c	c2	c	c	c2	l4	l4	l5	l5	l5	h	-	-	-	-
lc	c	c	lc	l	l	c	c5	c2	l2	-	-	-	f	-	f2
c	c	-	-	-	-	-	l	c	-	l	f	f	f2	-	f
-	l	c	l	-	c	c	c	c	c	c	i	f2	f2	f2	f
l2	l	l	l3	l3	l3	-	-	l2	l3	-	f2	f2	f4	f3	f5
c	c	-	-	-	-	-	-	c	c2	-	f	f	-	f	f3
l	-	c	-	-	-	-	-	-	-	l	-	-	-	-	-
l	l3	l2	l	-	-	-	-	l	-	-	-	-	-	-	-
-	-	-	l	l	-	-	-	-	-	-	-	-	-	f2	f4
c	c	l	-	l	l	l2	l	l	-	l3	-	-	-	f	f2
l	-	l2	-	-	c	-	-	-	c	-	f2	f2	f2	-	f
-	l	c	l2	l	l	-	-	-	c	l	-	-	-	-	-
c	c	l4	l	c	l	-	-	-	-	-	f	f	f	f	-
c	l	l	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	l	l	h	c	-	-	-	-	-	-	-
l2	l	lc	c3	c	-	l	l	lc	lc	-	-	f	f6	f2	f3
c	c	c	c	c	c	c	c	c	c2	c4	-	f	f	f3	f3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

B

MEDIAN VALUES SEPTEMBER 1963

Hour Local	fmin (Mc)	foF2 (Mc)	M(3000)F2	h'F2 (km)	h'F (km)	foF1 (Mc)	M(3000)F1	foE* (Mc)	h'E (km)	fbEs (Mc)	foEs (Mc)	h'Es (km)
00	1.7	5.5	3.35	-	250	-	-	-	-	2.3	3.3	98
01	1.5	5.1	3.50	-	227	-	-	-	-	2.0	3.3	100
02	1.5	4.2	3.62	-	210	-	-	-	-	2.1	3.0	100
03	1.4	3.0	3.55	-	213	-	-	-	-	1.4	1.8	108
04	1.2	2.4	3.62	-	233	-	-	-	-	1.9	2.3	110
05	1.6	2.0	3.40	-	250	-	-	-	-	2.2	2.5	110
06	1.8	3.1	3.35	-	250	-	-	-	-	2.0	2.6	110
07	2.0	6.1	3.55	-	225	-	-	-	-	2.8	3.7	108
08	2.7	7.6	3.30	285	215	-	-	-	108	3.5	4.3	104
09	3.0	8.1	2.80	310	230	4.3	3.95	-	110	3.7	4.5	102
10	3.5	7.6	2.65	340	200	4.5	3.95	-	110	4.1	5.4	100
11	3.0	7.3	2.65	350	190	4.6	4.02	-	110	4.2	5.8	100
12	3.3	7.2	2.70	338	200	4.6	4.05	-	109	4.0	4.8	98
13	3.5	7.6	2.70	328	190	4.6	4.10	-	110	4.3	4.8	96
14	3.7	8.3	2.70	318	200	4.5	3.95	-	109	3.9	4.6	102
15	3.4	9.1	2.85	300	200	4.5	3.90	-	108	3.8	4.2	98
16	2.9	10.0	3.15	268	210	4.3	3.95	-	108	3.6	3.8	94
17	2.6	10.2	3.22	260	220	-	4.20*	-	-	3.2	2.9	105
18	2.1	10.2	3.20	-	230	-	-	-	-	2.7	3.9	100
19	1.9	9.7	3.25	-	220	-	-	-	-	2.4	3.5	100
20	1.8	9.0	3.25	-	220	-	-	-	-	2.6	3.8	100
21	1.8	7.5	3.30	-	225	-	-	-	-	2.1	3.0	100
22	1.8	6.9	3.20	-	238	-	-	-	-	2.2	4.0	100
23	1.7	5.7	3.18	-	255	-	-	-	-	2.3	3.2	99

\* Insufficient data for reliable median.

IONOSPHERIC DATA  
MONTHLY MEDIAN CHARACTERISTICS  
BANGKOK, THAILAND  
SEPTEMBER 1963

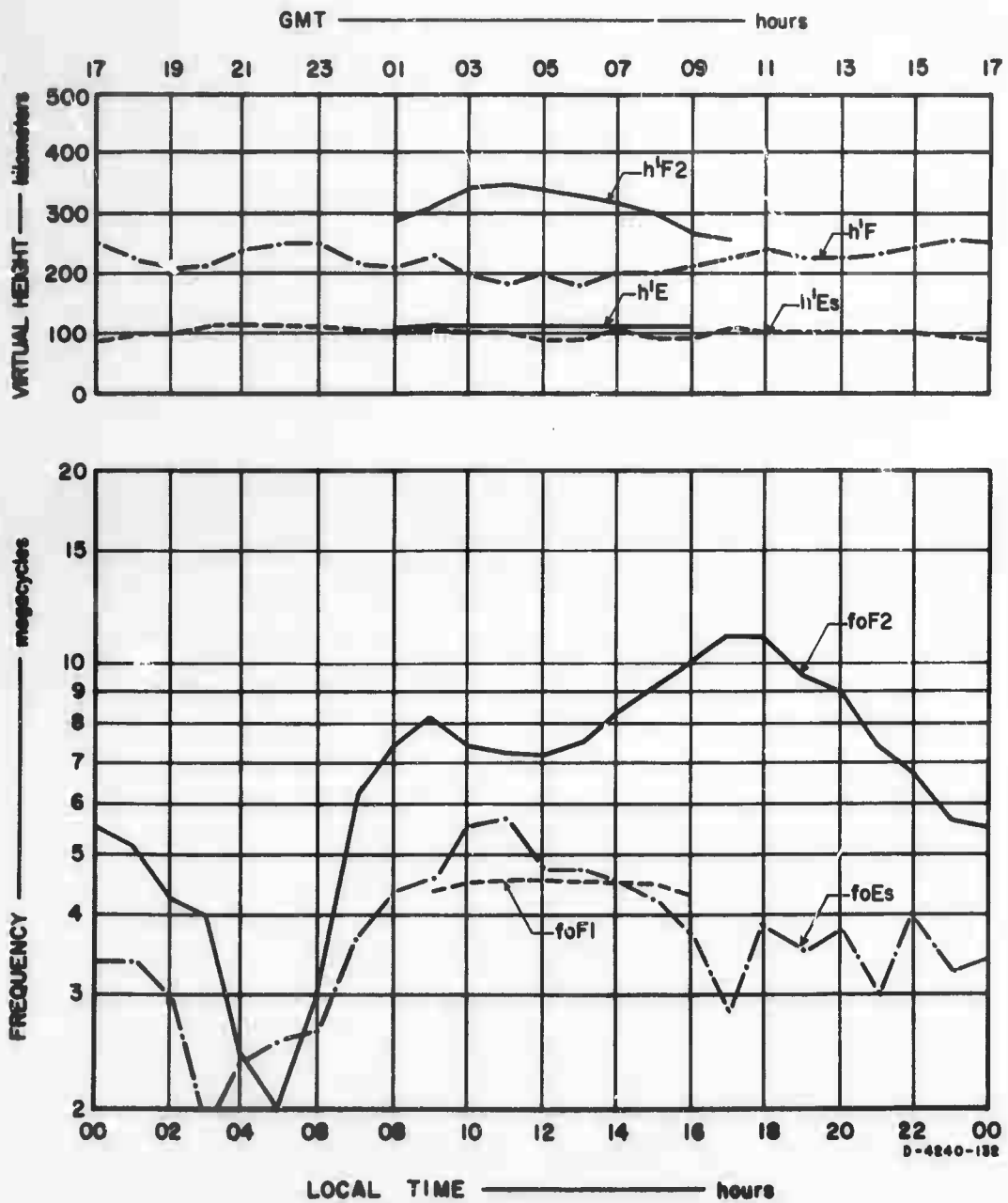


FIG. 1 SUMMARY GRAPHS

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